Wyoming Department of Education

Assessment Resources for Wyoming Mathematics

Presented in Casper
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Today, We Will Discuss:

- 2015 Math Assessment Blueprint
- 2014 Math PLDs (Performance Level Descriptors)
- Shifts in CCSS-M
- Instructional Practices
- Sample Items
  - PAWS RTQ & Data
  - SBAC

2015 Math Assessment Blueprints

- http://edu.wyoming.gov/download/assessments/2015-Math-PAWS-Blueprint-FINAL.pdf

- Go to http://edu.wyoming.gov
  - For Educators
    - State Assessment Topics
    - PAWS
      - Assessment Related Links (bottom of page)

http://edu.wyoming.gov/educators/assessment/paws/

Grade Specific Resources

These resources include: Rubrics, Assessment Descriptions, Released Items, Draft Writing paper and Traffic Signal suggestions.

- Grade 3
- Grade 4
- Grade 5
- Grade 6
- Grade 7
- Grade 8

Assessment Related Links

PAWS Blueprints

- Reading
- Mathematics
- Science

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DEPARTMENT OF EDUCATION

IN THE CLASSROOM | BEYOND THE CLASSROOM | DATA & ACCOUNTABILITY | FOR EDUCAT

State Assessment Topics

- State Assessment Index
- School Year Schedule 2014-2015
- Important Dates
- 2015 Administration Materials
- Assessment Newsletter Archives
- PAWS
- -PAWS Grade 3
- -PAWS Grade 4
- -PAWS Grade 5
- -PAWS Grade 6
- -PAWS Grade 7
- -PAWS Grade 8
- -PAWS Blueprints
- -PAWS Results
- -Accommodations
- Wy-ALT
- SAWS

PAWS, Grade 5

Math

- 2014 Grade 5 Math Released Items
- Grade 5 Math Blueprint

Reading

- 2014 Grade 5 Reading Released Items
- Grade 5 Reading Blueprint

Writing

- 2014 Grade 5 Writing Released Items
- Draft Writing Page

2015 Math Assessment Blueprints

Domain / Standard	2015 PAWS - 3rd Grade Mathematics Cluster Heading	Focus m = major s = supporting a = additional	Items Per Domain	# of Items / Cluster Heading	PAWS Emphasis
Operations and Algebraic Thinking			**20**		
3.OA.1 3.OA.2 3.OA.3 3.OA.4	Represent and solve problems involving multiplication and division.	m		6-8	40%
3.OA.5 3.OA.6	Understand properties of multiplication and the relationship between multiplication and division.	m		3-5	
3.OA.7	Multiply and divide within 100.	m		3-5	
3.OA.8 3.OA.9	Solve problems involving the four operations, and identify and explain patterns in arithmetic.	m		4-6	
Number and Operations - Base Ten			**6**		
3.NBT.1 3.NBT.2 3.NBT.3	Use place value understanding and properties of operations to perform multi-digit arithmetic.	a		6	12%
Number and Operations - Fractions			**6**		
3.NF.1 3.NF.2 3.NF.3	Develop understanding of fractions as numbers.	m		6	12%
Measurement and Data			**12**		
3.MD.1 3.MD.2	Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	m		3-5	24%
3.MD.3 3.MD.4	Represent and interpret data.	s		1-3	
3.MD.5 3.MD.6 3.MD.7	Geometric measurement: understand concepts of area and relate area to multiplication and to addition.	m		3-5	
3.MD.8	Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	a		1-3	
Geometry			**6**		
3.G.1 3.G.2	Reason with shapes and their attributes.	s		6	12%
			50	**50**	**100%**

Released May 2014 PAWS Mathematics Blueprint

Wyoming Department of Education

2015 Math Assessment Blueprints

Domain / Standard	2015 PAWS - 7th Grade Mathematics Cluster Heading	Focus m = major s = supporting a = additional	Items Per Domain	# of Items / Cluster Heading	PAWS Emphasis
Ratios and Proportional Relationships			**13**		
7.RP.1 7.RP.2 7.RP.3	Analyze proportional relationships and use them to solve real-world and mathematical problems.	**m**		**13**	**22%**
The Number System			**10**		
7.NS.1 7.NS.2 7.NS.3	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	**m**		**10**	**17%**
Expressions and Equations			**18**		
7.EE.1 7.EE.2	Use properties of operations to generate equivalent expressions.	**m**		**5-7**	**31%**
7.EE.3 7.EE.4	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	**m**		**11-13**	
Geometry			**9**		
7.G.1 7.G.2 7.G.3	Draw, construct, and describe geometrical figures and describe the relationships between them.	a		**1-3**	**15%**
7.G.4 7.G.5 7.G.6	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	a		**6-8**	
Statistics and Probability			**9**		
7.SP.1 7.SP.2	Use random sampling to draw inferences about a population.	s		**2-4**	**15%**
7.SP.3 7.SP.4	Draw informal comparative inferences about two populations.	a		**1-3**	
7.SP.5 7.SP.6 7.SP.7 7.SP.8	Investigate chance processes and develop, use, and evaluate probability models.	s		**3-5**	
			59	**59**	**100.00%**

Released May 2014 PAWS Mathematics Blueprint Wyoming Department of Education

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QUESTIONS

Math PLDs

http://edu.wyoming.gov/educators/standards/mathematics

May 1, 2014

2014 Mathematics Grade 3 Performance Level Descriptors

Level	Basic	Proficient	Advanced
Policy Level PLDs	Marginal academic performance, work approaching, but not yet reaching, satisfactory performance, indicating partial understanding and limited display of the knowledge and skills included in the Wyoming Content and Performance Standards.	Satisfactory academic performance indicating a solid understanding and display of the knowledge and skills included in the Wyoming Content and Performance Standards.	Superior academic performance indicating an in-depth understanding and exemplary display of the knowledge and skills included in the Wyoming Content and Performance Standards.
Domain	**Operations and Algebraic Thinking**		
Range PLD: Cluster A - Represent and solve problems involving multiplication and division.	Basic students interpret products and quotients of whole numbers (2, 5, 10) using a pictorial representation (3.OA.1, 3.OA.2);	Proficient students interpret products and quotients of whole numbers in mathematical and real-world contexts (3.OA.1);	Advanced students write products and quotients in mathematical and real-world contexts;
	Basic students use multiplication within 100 to solve and represent word problems provided a pictorial representation (3.OA.3);	Proficient students use multiplication and division within 100 to solve and represent word problems provided a pictorial representation (3.OA.3);	Advanced students use multiplication and division within 100 to solve and represent word problems (3.OA.3);
	Basic students determine the product or quotient in an equation given one of the factors to be 2, 5, or 10 (3.OA.4).	Proficient students determine the unknown whole number in a multiplication or division equation given the other two facts (3.OA.4).	Advanced students interpret two or more equations each with an unknown number in a multiplication or division equation (3.OA.4).
Range PLD: Cluster B - Understand properties of multiplication and the relationship between multiplication and division.	Basic students use the commutative property of multiplication to find the product of familiar numbers, e.g. 1, 2, 5, and 10 (3.OA.5);	Proficient students use the associative property to multiply two or more numbers (3.OA.5);	Advanced students use the distributive property to multiply two numbers (3.OA.5);
	Basic students use multiplication to find a missing factor in a division equation (3.OA.6).	Proficient students use division to find a missing factor in a multiplication equation (3.OA.6).	Advanced students use division to find unknown factors given a verbal context (3.OA.6).
Range PLD: Cluster C - Multiply and divide within 100	Basic students multiply with factors of 2, 5, and 10 and divide with divisors of 2 or 5 within 50 (3.OA.7);	Proficient students fluently multiply two numbers with factors of 10 or less and divide two numbers with both the divisor and quotient being 10 or less (3.OA.7);	Advanced students fluently multiply two numbers within 100 with one factor greater than 10 and one factor less than 10 and divide two numbers within 100 with either a divisor or quotient greater than 10 (3.OA.7);
	Basic students identify the relationship between multiplication and division in a mathematical context (3.OA.7).	Proficient students describe the relationship between multiplication and division (3.OA.7).	Advanced students justify the relationship between multiplication and division (3.OA.7).
Range PLD: Cluster D - Solve problems involving the four operations and identify and explain patterns in arithmetic.	Basic students solve two-step word problems involving only addition and subtraction (3.OA.8);	Proficient students solve and represent as an equation a two-step real-world or mathematical problem using the four operations (3.OA.8);	Advanced students solve and represent as an equation a two-step real-world or mathematical problem involving the four operations and assess the reasonableness of answers (3.OA.8);
	Basic students predict the next term of a pattern described by an addition or a subtraction rule (3.OA.9).	Proficient students predict any term of a pattern and create a rule to describe the pattern (3.OA.9).	Advanced students identify a characteristic of a pattern that is not explicitly given (3.OA.9).

Math PLDs

May 1, 2014

2014 Mathe

Level	Basic
Policy Level PLDs	Marginal academic performance, work approaching, but not yet reaching, satisfactory performance, indicating partial understanding and limited display of the knowledge and skills included in the Wyoming Content and Performance Standards.
Domain	
Range PLD: Cluster A - Represent and solve problems involving multiplication and division.	Basic students interpret products and quotients of whole numbers (2, 5, 10) using a pictorial representation (3.OA.1, 3.OA.2);
	Basic students use multiplication within 100 to solve and represent word problems provided a pictorial representation (3.OA.3);
	Basic students determine the product or quotient in an equation given one of the factors to be 2, 5, or 10 (3.OA.4).
Range PLD: Cluster B - Understand properties of multiplication and the relationship between multiplication and division.	Basic students use the commutative property of multiplication to find the product of familiar numbers, e.g. 1, 2, 5, and 10 (3.OA.5);
	Basic students use multiplication to find a missing factor in a division equation (3.OA.6).
Range PLD: Cluster C - Multiply and divide within 100.	Basic students multiply with factors of 2, 5, and 10 and divide with divisors of 2 or 5 within 50 (3.OA.7);
	Basic students identify the relationship between multiplication and division in a mathematical context (3.OA.7).

Operations and Algebraic Thinking

May 1, 2014

2014 Mathematics Grade 3 Performance Level Descriptors

Level	Basic	Proficient
Policy Level PLDs	Marginal academic performance, work approaching, but not yet reaching, satisfactory performance, indicating partial understanding and limited display of the knowledge and skills included in the Wyoming Content and Performance Standards.	Satisfactory academic performance indicating a solid understanding and display of the knowledge and skills included in the Wyoming Content and Performance Standards.
Domain		**Operations and Algebraic Thinking**
Range PLD: Cluster A - Represent and solve problems involving multiplication and division.	Basic students interpret products and quotients of whole numbers (2, 5, 10) using a pictorial representation (3.OA.1, 3.OA.2);	Proficient students interpret products and quotients of whole numbers in mathematical and real-world contexts (3.OA.1);
	Basic students use multiplication within 100 to solve and represent word problems provided a pictorial representation (3.OA.3);	Proficient students use multiplication and division within 100 to solve and represent word problems provided a pictorial representation (3.OA.3);
	Basic students determine the product or quotient in an equation given one of the factors to be 2, 5, or 10 (3.OA.4).	Proficient students determine the unknown whole number in a multiplication or division equation given the other two facts (3.OA.4).
Range PLD: Cluster B - Understand properties of multiplication and the relationship between multiplication and division.	Basic students use the commutative property of multiplication to find the product of familiar numbers, e.g. 1, 2, 5, and 10 (3.OA.5);	Proficient students use the associative property to multiply two or more numbers (3.OA.5);
	Basic students use multiplication to find a missing factor in a division equation (3.OA.6).	Proficient students use division to find a missing factor in a multiplication equation (3.OA.6).
Range PLD: Cluster C - Multiply and divide within 100.	Basic students multiply with factors of 2, 5, and 10 and divide with divisors of 2 or 5 within 50 (3.OA.7);	Proficient students fluently multiply two numbers with factors of 10 or less and divide two numbers with both the divisor and quotient being 10 or less (3.OA.7);
	Basic students identify the relationship between multiplication and division in a mathematical context (3.OA.7).	Proficient students describe the relationship between multiplication and division (3.OA.7).

Math PLDs

ıematics Grade 3 Performance Level Descriptors

Proficient	Advanced
Satisfactory academic performance indicating a solid understanding and display of the knowledge and skills included in the Wyoming Content and Performance Standards.	Superior academic performance indicating an in-depth understanding and exemplary display of the knowledge and skills included in the Wyoming Content and Performance Standards.
Operations and Algebraic Thinking	
Proficient students interpret products and quotients of whole numbers in mathematical and real-world contexts (3.OA.1);	Advanced students write products and quotients in mathematical and real-world contexts;
Proficient students use multiplication and division within 100 to solve and represent word problems provided a pictorial representation (3.OA.3);	Advanced students use multiplication and division within 100 to solve and represent word problems (3.OA.3);
Proficient students determine the unknown whole number in a multiplication or division equation given the other two facts (3.OA.4).	Advanced students interpret two or more equations each with an unknown number in a multiplication or division equation (3.OA.4).
Proficient students use the associative property to multiply two or more numbers (3.OA.5);	Advanced students use the distributive property to multiply two numbers (3.OA.5);
Proficient students use division to find a missing factor in a multiplication equation (3.OA.6).	Advanced students use division to find unknown factors given a verbal context (3.OA.6).
Proficient students fluently multiply two numbers with factors of 10 or less and divide two numbers with both the divisor and quotient being 10 or less (3.OA.7);	Advanced students fluently multiply two numbers within 100 with one factor greater than 10 and one factor less than 10 and divide two numbers within 100 with either a divisor or quotient greater than 10 (3.OA.7);
Proficient students describe the relationship between multiplication and division (3.OA.7).	Advanced students justify the relationship between multiplication and division (3.OA.7).

Math PLDs

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QUESTIONS

3 Key Shifts – Math Standards

- **Focus** strongly where the Standards focus.
- **Coherence** – Think across grades and link to major topics within grades.
- **Rigor** – In major topics, pursue a balance of the following:
  - Deep Conceptual Understanding (3.NF.1 Understand…)
  - Procedural Fluency (5.NBT.5 Fluently …)
  - Application (7.NS.3 Solve real-world and mathematical problems …)

#1 – Focus Strongly Where the Standards Focus

from achievethecore.org

- Significantly narrow the scope of content and deepen how time and energy is spent in the math classroom
- Focus deeply on what is emphasized in the standards, so that students gain strong foundations.

Less topic + more depth = more time to master content

Key Areas of Focus in Mathematics

from achievethecore.org

Grade	Focus Areas in Support of Rich Instruction and Expectations of Fluency and Conceptual Understanding
K – 2	Addition and Subtraction – concepts, skills, and problem solving and place value
3 – 5	Multiplication and Division of whole numbers and fractions – concepts, skills, and problem solving
6	Ratios and Proportional Reasoning; early expressions and equations
7	Ratios and Proportional Reasoning; arithmetic of rational numbers
8	Linear Algebra and Linear Functions

#2 – Coherence – Think Across Grades and Link to Major Topics Within Grades (from achievethecore.org)

- Carefully connect the learning within and across grades so students can build new understanding on foundations built in previous years.
- Begin to count on solid conceptual understanding of core content and build on it. Each standard is not a new event, but an extension of previous learning.

Coherence – (from achievethecore.org)

- Many of the standards start with "Apply and extend previous understandings of …."
  - 4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
  - 5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
  - 5.NF.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
  - 6.NS Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

#3 – Rigor - (from achievethecore.org)

- Pursuit of the following requires equal intensity in time, activities, and resources:
  - Solid conceptual understanding
    - Not just how to get the answer, instead support students' ability to access concepts from a number of perspectives
  - Procedural skill and fluency
    - The standards require speed and accuracy in calculation.
    - Structure class time &/or HW time to practice core functions, such as single-digit multiplication, so they are more able to understand and manipulate more complex concepts later. (see next slide)
  - Application of skills in problem solving situations
    - Provide opportunities to apply math concepts in 'real world' situations and apply to other content such as science.

Required Fluencies K-6 (from achievethecore.org)

Grade	Standard	Required Fluency
K	K.OA.5	Add/Subtract within 5
1	1.OA.6	Add/Subtract within 10
2	2.OA.2 2.NBT.5	Add/Subtract within 20 (know single-digit sums from memory) Add/Subtract within 100
3	3.OA.7 3.NBT.2	Add/Subtract within 100 (know single-digit sums from memory) Add/Subtract within 1,000
4	4.NBT.4	Add/Subtract within 1,000,000
5	5.NBT.5	Multi-digit Multiplication
6	6.NS.2-3	Multi-digit Division Multi-digit Decimal Operations

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Structuring the Practices

Problem Solving and Precision

1. Make sense of problems and persevere in solving them
6. Attend to precision

Reasoning and Explaining

2. Reason abstractly and quantitatively

3. Construct viable arguments and critique the reasoning of others

Modeling and Using Tools

4. Model with mathematics

5. Use appropriate tools strategically

Seeing Structure and Generalizing

7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.

Helping Struggling Students Succeed

- Those who struggle in HS mathematics usually struggle with the fundamentals causing further consternation and struggle as the content builds on itself.

- Give continual practice of previously learned mathematical skills. Students are always using previously learned skills to integrate into bigger ideas, so the more proficient and efficient they are with those skills, the easier they are to apply to new ideas.
  - ✓ vocabulary (ensure understanding of what they are being asked to do)
  - ✓ warm-ups at the beginning of class (possibly ACT or SBAC practice items)
    - ✓ practice with mental math

Helping Struggling Students Succeed

(cont.)

- A strong foundation in **Number Sense** and **Algebra** will lead to success in H.S.
- **Intermediate Algebra** could use the most improvement on the **ACT** math section.

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QUESTIONS

http://edu.wyoming.gov/educators/assessment/paws/

Grade Specific Resources

These resources include: Rubrics, Assessment Descriptions, Released Items, Draft Writing paper and Traffic Signal suggestions.

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PAWS, Grade 5

Math

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Writing

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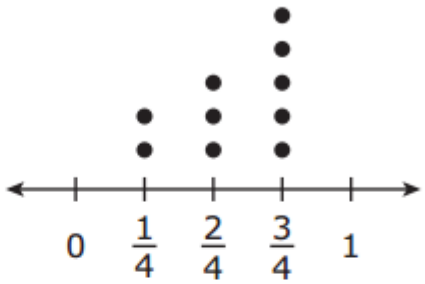
PAWS RTQ - Grade 4 Item

00 **The line plot provided shows the width in inches of 10 buttons.**



WIDTH OF BUTTONS IN INCHES

What is the total length, in inches, of all the buttons?

Ⓐ $1\frac{1}{2}$

Ⓑ $2\frac{1}{2}$

Ⓒ $3\frac{3}{4}$

Ⓓ $5\frac{3}{4}$

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PAWS RTQ – Grade 4 Item (cont.)

Item Information	
2012 WyCPS Domain:	Measurement and Data
2012 WyCPS Cluster:	Represent and interpret data.
2012 WyCPS Standard:	4.MD.4 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.
Item Code:	VF493354

Admin:	Item Type:	Correct Answer:	Item Dok:	Total N-count:	Pvalue/Mean Score:
Spring 2013	MC	D	2	706	0.317

Score Analysis					
MC	**A**	**B**	**C**	**D***	**Omit**
%Choosing	21.105	18.98	28.045	31.728	0.142

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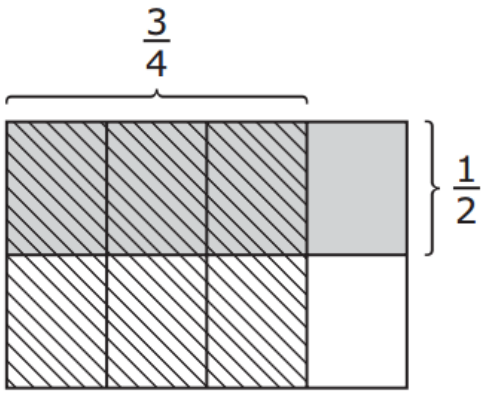
PAWS RTQ – Grade 5 Item

In the rectangle shown, $\frac{1}{2}$ is shaded in gray and $\frac{3}{4}$ is filled with diagonal lines.



Which equation could be used to represent the multiplication shown in this rectangle?

Ⓐ $\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$

Ⓑ $\frac{3}{4} \times \frac{1}{2} = \frac{7}{8}$

Ⓒ $\frac{3}{4} \times \frac{1}{2} = \frac{2}{8}$

Ⓓ $\frac{3}{4} \times \frac{1}{2} = \frac{4}{8}$

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PAWS RTQ – Grade 5 Item (cont.)

Item Information	
2012 WyCPS Domain:	Number and Operations—Fractions
2012 WyCPS Cluster:	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
2012 WyCPS Standard:	5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
Item Code:	VF492128

Admin:	Item Type:	Correct Answer:	Item Dok:	Total N-count:	Pvalue/Mean Score:
Spring 2013	MC	A	1	668	0.696

Score Analysis					
MC	**A***	**B**	**C**	**D**	**Omit**
%Choosing	69.611	15.269	5.689	9.431	0

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PAWS RTQ – Grade 7 Item (cont.)

00 **The staff at a car dealership sold 56 cars in March. If the total sales in April increase by at least 20%, the staff will earn a bonus. What is the minimum number of cars the staff will need to sell in April to earn the bonus?**

A) 68

B) 67

C) 12

D) 11

Item Information	
2012 WyCPS Domain:	Ratios and Proportional Relationships
2012 WyCPS Cluster:	Analyze proportional relationships and use them to solve real-world and mathematical problems.
2012 WyCPS Standard:	7.RP.3 Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.
Item Code:	VF492629

Admin:	Item Type:	Correct Answer:	Item Dok:	Total N-count:	Pvalue/Mean Score:
Spring 2013	MC	A	2	660	0.294

Score Analysis					
MC	**A***	**B**	**C**	**D**	**Omit**
%Choosing	29.394	34.545	19.242	16.364	0.455

PAWS RTQ – Grade 8 Item

- **Two functions are given, one as a verbal description and one as an equation.**

Function 1
The perimeter of a square, y, is equal to the length of one side of the square, x, times 4.

Function 2
$y = 2x + 5$

Which of the following can be concluded about the two functions?

A) The rate of change for Function 1 is less than the rate of change for Function 2.

B) The rate of change for Function 1 is greater than the rate of change for Function 2.

C) For all positive inputs of x, the output for Function 1 is less than the output for Function 2.

D) For all positive inputs of x, the output for Function 1 is greater than the output for Function 2.

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PAWS RTQ – Grade 8 Item (cont.)

Item Information	
2012 WyCPS Domain:	Functions
2012 WyCPS Cluster:	Define, evaluate, and compare functions.
2012 WyCPS Standard:	8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.
Item Code:	VF492360

Admin:	Item Type:	Correct Answer:	Item Dok:	Total N-count:	Pvalue/Mean Score:
Spring 2013	MC	B	2	672	0.345

Score Analysis					
MC	**A**	**B***	**C**	**D**	**Omit**
%Choosing	17.113	34.524	28.274	19.792	0.298

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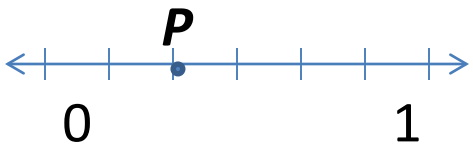
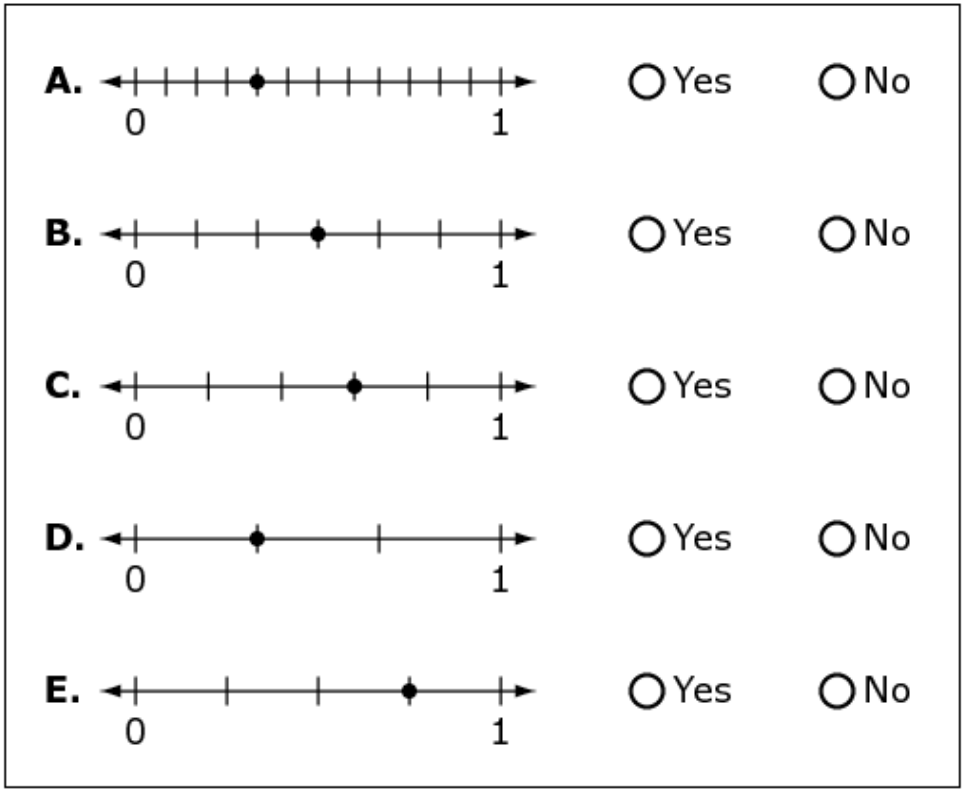
Sample SBAC Items – sampleitems.smarterbalanced.org

Look at point *P* on the number line.



Look at number lines A – E. Is the point on each number line equal to the number shown by *P?* Choose *Yes* or *No.*



GRADE 3 – 3.NF.3a

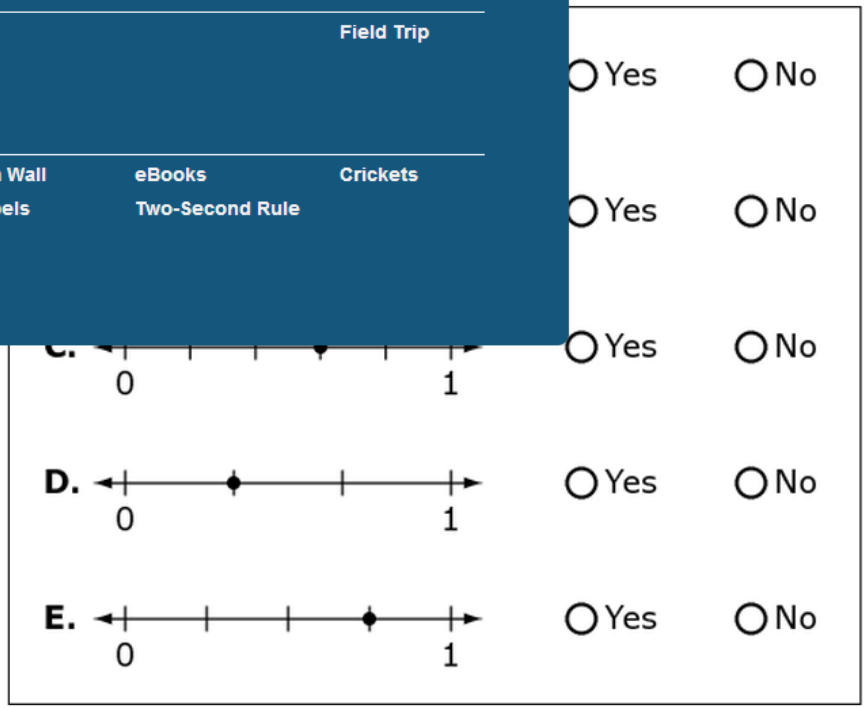
Sample SBAC Items – sampleitems.smarterbalanced.org

VIEW MORE MATHEMATICS SAMPLE ITEMS | ABOUT THIS ITEM

Filter By: Technology Enhanced | Performance Tasks | Connections Across Grades | Difficulty Progressions

Grade Band	Concepts and Procedures	Problem Solving	Communicating Reasoning	Modeling and Data Analysis	Performance Tasks
3-5	Fractions 1 Multiplication and Division Fractions 3	Fractions 2a Fractions 2b Rectangle 1 Rectangle 2	The Contest Swimmers		Planting Tulips
6-8	Expressions and Equations 1 Expressions and Equations 2 Expressions and Equations 3 Integer Expressions	Sandbags 1 Sandbags 2 Calculator			Field Trip
High School	Rationals and Radicals	Circle 1 Circle 2 Used Car Water Tank	Room Wall Decibels	eBooks Two-Second Rule	Crickets

No.



Sample SBAC Items – sampleitems.smarterbalanced.org

E MATHEMATICS SAMPLE ITEMS | ABOUT THIS ITEM

S | English Language Arts / L

Fractions 1

Grade: 3

Claim 1: Concepts and Procedures

Target: 1F

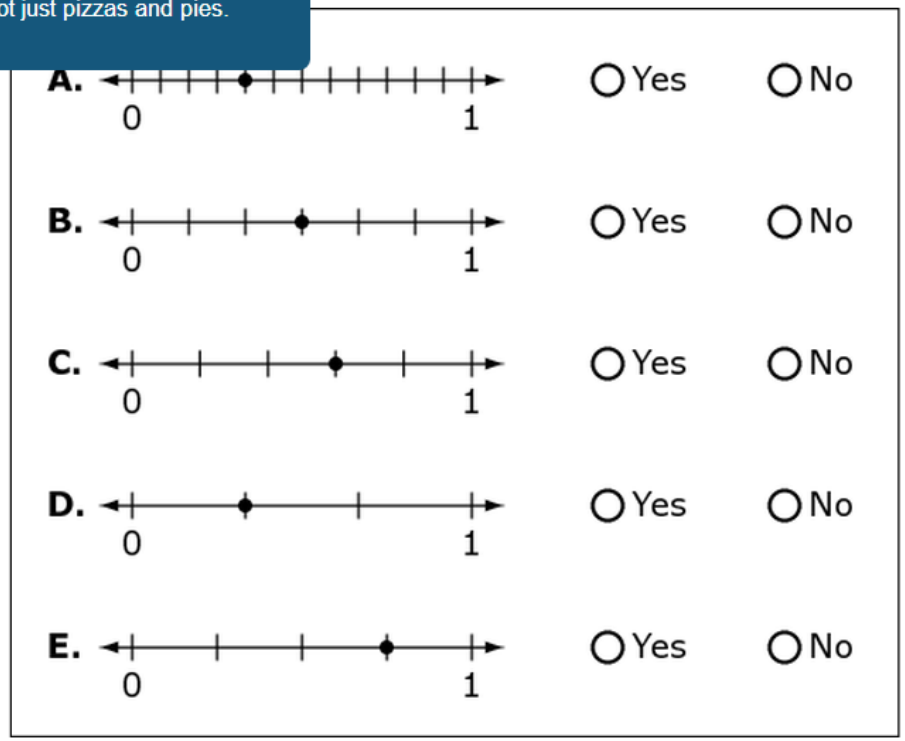
CCSS: 3.NF.3a

This item demonstrates a shift in the standards, asking grade 3 students to understand that fractions are numbers, not just pizzas and pies.

43044

Look at point *P* on the number line.

Look at number lines A – E. Is the point on each number line equal to the number shown by *P*? Choose Yes or No.



Sample SBAC Items – sampleitems.smarterbalanced.org

43051

Five friends ordered 3 large sandwiches.

James ate $\frac{3}{4}$ of a sandwich.

Katya ate $\frac{1}{4}$ of a sandwich.

Ramon ate $\frac{3}{4}$ of a sandwich.

Sienna ate $\frac{2}{4}$ of a sandwich.

How much sandwich is left for Oscar?

Question

1	2	3
4	5	6
7	8	9
0	.	/

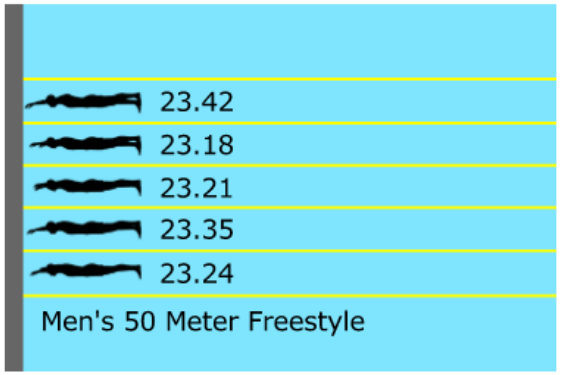
Delete

GRADE 4 – 4.NF.3

Sample SBAC Items – sampleitems.smarterbalanced.org

43025

Five swimmers compete in the 50-meter race. The finish time for each swimmer is shown in the video.



Explain how the results of the race would change if the race used a clock that rounded to the nearest tenth.

GRADE 5 – 5.NBT.3

Sample SBAC Items – sampleitems.smarterbalanced.org

43053

Look at each expression. Is it equivalent to $\frac{x+3y}{2}$?

Select Yes or No for expressions A – D.

A.	$\frac{4x+3y}{8}$	○ Yes	○ No
B.	$\frac{5}{4}\left(\frac{2x+6}{5}\right)$	○ Yes	○ No
C.	$\frac{1}{2}(x+3y)$	○ Yes	○ No
D.	$\frac{2}{3}\left(\frac{5x}{6}+\frac{9y}{4}-\frac{x}{12}\right)$	○ Yes	○ No

GRADE 7 – 7.EE.2

Sample SBAC Items – sampleitems.smarterbalanced.org

E MATHEMATICS SAMPLE ITEMS

S | English Language Arts / L

ABOUT THIS ITEM

Expressions and Equations 2

Grade: 7

Claim 1: Concepts and Procedures

Target: 1C

CCSS: 7.EE.2

This item would likely have a high difficulty level. High difficulty items are essential for measurement precision of top-performing students. Work on equivalent expressions in grades 6 and 7 supports students' ability to solve increasingly complex equations in grade 8 and high school.

43053

Look at each expression. equivalent to $\frac{x+3y}{2}$?

Select Yes or No for expressions A – D.

8	○ Yes	○ No
B. $\frac{5}{4}\left(\frac{2x+6}{5}\right)$	○ Yes	○ No
C. $\frac{1}{2}(x+3y)$	○ Yes	○ No
D. $\frac{2}{3}\left(\frac{5x}{6}+\frac{9y}{4}-\frac{x}{12}\right)$	○ Yes	○ No

Sample SBAC Items – sampleitems.smarterbalanced.org

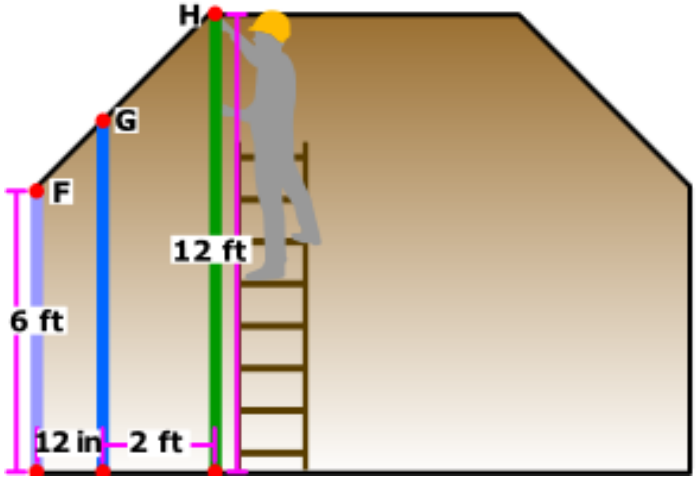
For each linear equation in the table, select whether the equation has no solution, one solution, or infinitely many solutions.

Equation	No Solution	One Solution	Infinitely Many Solutions
$36x + 24 = 12(x + 2 + 2x)$			
$x = x + 1$			
$-12(x + 2) = -14x + 2$			

GRADE 8
8.EE.7a

Sample SBAC Items – sampleitems.smarterbalanced.org

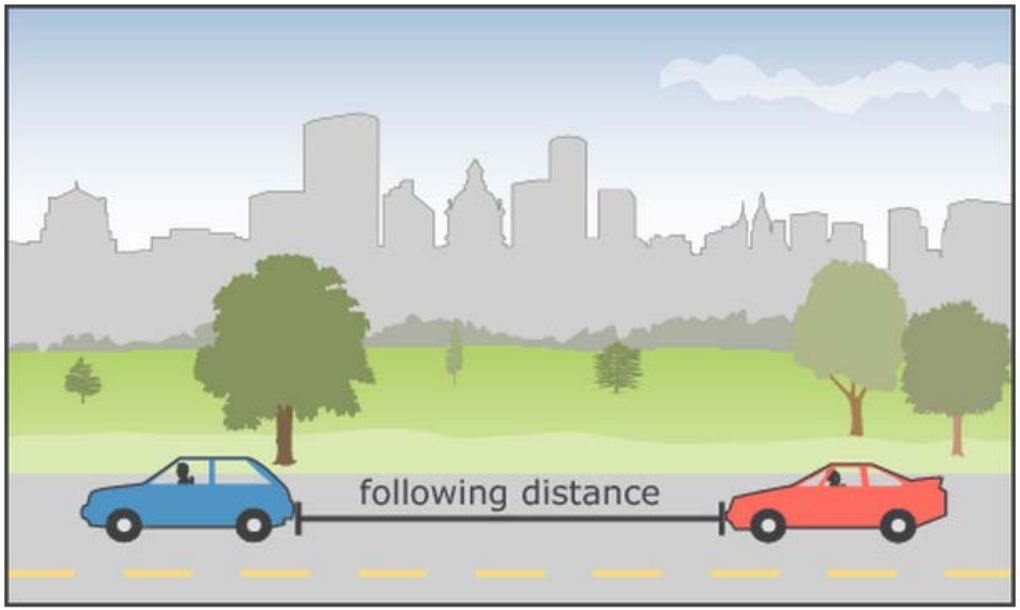
A construction worker is using wooden beams to reinforce the back wall of a room.



Determine the height, in feet, of the beam that ends at point G. Explain how you found your answer.

8.EE.6

Sample SBAC Items sampleitems.smarterbalanced.org



The “two-second rule” is used by a driver who wants to maintain a safe following distance at any speed. A driver must count two seconds from when the car in front of him or her passes a fixed point, such as a tree, until the driver passes the same fixed point. Drivers use this rule to determine the minimum distance to follow a car traveling at the same speed. A diagram representing this distance is shown.

As the speed of the cars increases, the minimum following distance also increases. Explain how the “two-second rule” leads to a greater minimum following distance as the speed of the cars increases. As part of your explanation, include the minimum following distances, in feet, for cars traveling at 30 miles per hour and 60 miles per hour.

F.BF.1a & F.LE.1b

Wyoming Department of Education

QUESTIONS

www.turnonccmath.net

- A learning trajectory resource to support interpretation of the CCSSM.
- The GISMO mathematics education research team, at NC State University's Friday Institute, developed 18 Learning Trajectories with descriptors that unpack all of the K-8 CCSSM Standards, with mapping to the CCSSM via a hexagon map of the standards.
- Can be used for PD, instructional planning, and teacher content knowledge enrichment.

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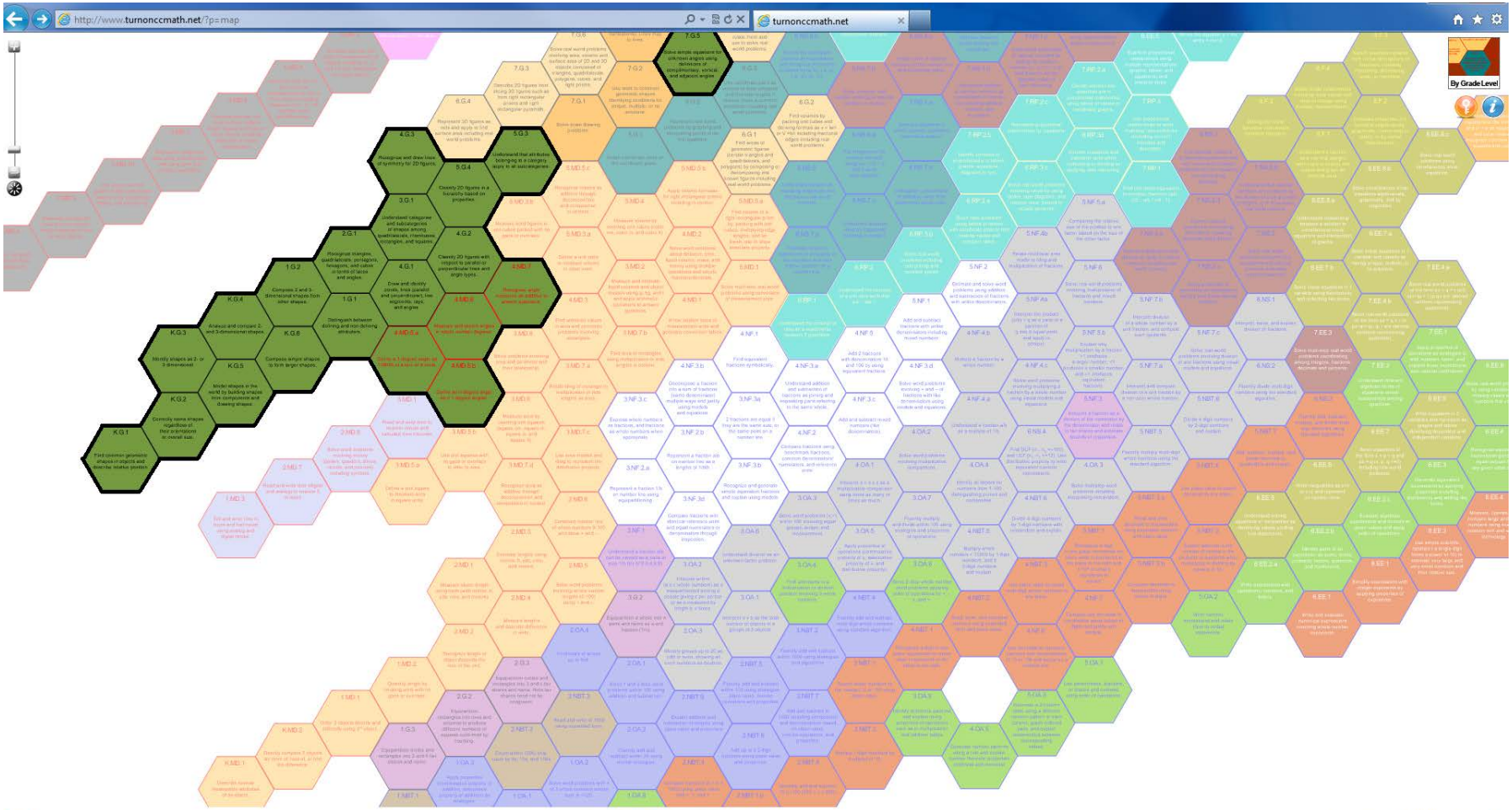


EXIT

By using this website, you agree to these TERMS AND CONDITIONS.

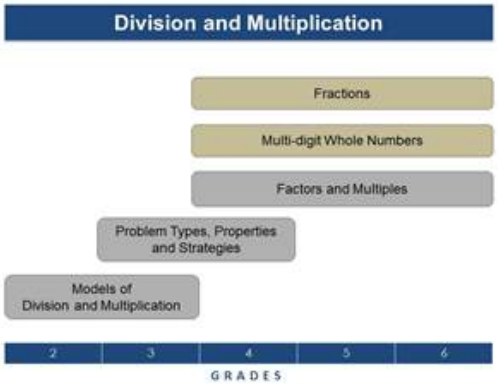
Descriptors and Bridging Standards © 2012 Jere Confrey, Ph.D.
Hexagon Map © 2011 Wireless Generation

www.turnonccmath.net

www.turnonccmath.net/ajax.php?key=division-and-multiplication&fmt=html#4.oa.4 - Google Chrome

www.turnonccmath.net/ajax.php?key=division-and-multiplication&fmt=html#4.oa.4

Structural Overview
Section 1: Understanding and Relating Multiplication and Division Operations
Section 2: Multiplication and Division Problem Types, Properties, and Strategies
Section 3: Factors and Multiples
Section 4: Multiplication and Division Problems Involving Multi-digit Whole Numbers
Section 5: Multiplication and Division Problems Involving Non-Whole Rational Number Operators (Fractions)



About the Structural Overview

Students enter division and multiplication with their experience in equipartitioning. From this conceptual development,

a. students understand that fair sharing of evenly divisible collections produces equal-sized groups,
b. the size of a fair share can be described as 1/nth of the whole collection or as a particular number of elements out of the total; and
c. the whole collection is n times as large as one person's share.

As the Structural Overview illustrates, this Learning Trajectory first highlights the models of division and

3.OA.2 Interpret whole number quotients of whole numbers. (example from www.turnonccmath.net)

In the next three standards, students are introduced to multiplication and division. These introduce the three primary models for multiplication and division; and these should be introduced *gradually* with ample time to compare and contrast the models.

Research has shown that very young children in preschool are often able to equipartition (or fair share) collections, before, or at the same time, as they learn to count. In order to find the size of the fair share in equipartitioning problems, children typically use “partitive strategies” (or dealing with one-to-one correspondence to each person). This strategy evolves into division. Hence, a standard about division is listed as the first model for division and multiplication.

Although the standard only references division, research has increasingly shown the benefits of introducing division and multiplication simultaneously *as inverse operations* that link to *different ways in which one asks questions about a given situation*. For example, …

5.NF.5 Interpret multiplication as scaling (resizing), by:

5b - Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number

Because students can translate multiplication by a fraction into a combination of multiplication and division (see Standard 4.NF.4.c), they can predict whether a fractional operator will increase or decrease the size of the quantity it operates on. If the operator is greater than one, then the numerator is greater than the denominator. When switched into a "daisy chain", the numerator is the multiplier and the denominator is the divisor. If a number is multiplied by a larger number than it is divided, then the result or product is larger than the quantity operated on. Students predict for example that in multiplying 16 by $^5/_3$, the product will be greater than 16.

Similarly, for the fraction as operator, if the denominator is greater than the numerator, then the fraction is less than one, and the quantity is divided by a larger number than it is multiplied, resulting in a smaller number. Students predict, for example, that in multiplying $^2/_3$ by $^3/_8$, the product will smaller than $^2/_3$rds.

Free Resources for CCSSM

- http://www.illustrativemathematics.org
  - ...Illustrating the range and types of mathematical work that students experience in a faithful implementation of the Common Core State Standards
- https://www.teachingchannel.org/videos?page=1&categories=topics_common-core
  - Teaching Channel – houses many short videos of lessons being taught in the classroom and can be broken out by subject, grade, and even common core
- https://mathreasoninginventory.com
  - Free from the Gates Foundation - MRI is an online formative assessment tool designed to make teachers' classroom instruction more effective. The MRI questions focus on number and operations and are based on content from the Common Core State Standards for Mathematics prior to sixth grade.
- http://www.nctm.org/resources/content.aspx?id=16385
  - Lessons & Teaching Ideas on the NCTM website

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Free Resources for CCSSM

- www.learnzillion.com
  - Includes lesson plans by specific standard
- http://achievethecore.org
  - Includes resources, sample problems, videos, instructional practice, PD, aligning materials, and math research (you can subscribe to the email newsletter and/or follow on Twitter)
- http://ime.math.arizona.edu
  - Math progressions documents for K-12 (CCSS-M were built on these narrative documents describing the progression of a topic across a number of grade levels, informed both by research and logical structure.
- http://commoncoretools.me
  - Manned by Bill McCallum, professor at UofA (AZ) and one of the writers of the CCSS-M. Bill responds to questions in his blog section; he and others also post information including news about tools being developed to support implementation of the math standards.

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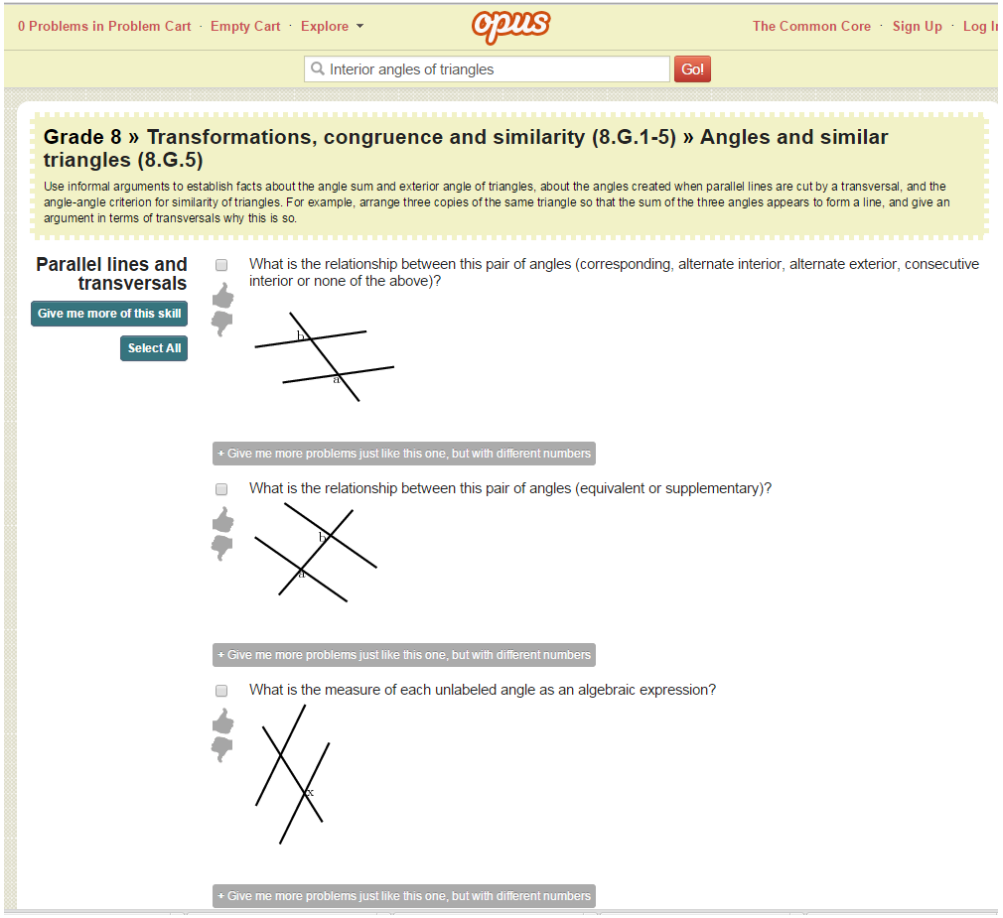
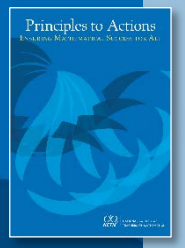
http://www.opusmath.com

- Search for problems and build great assignments aligned to CC
- Search by standard
- Strongest in grades 7 & 8 but they have a growing collection in other grades





Effective Mathematics Teaching Practices

1. Establish mathematics **goals** to focus learning.
2. Implement **tasks** that promote reasoning and problem solving.
3. Use and connect mathematical **representations.**
4. Facilitate meaningful mathematical **discourse**.
5. Pose purposeful **questions**.
6. Build **procedural fluency** from conceptual understanding.
7. Support **productive struggle** in learning mathematics.
8. **Elicit and use evidence** of student thinking.

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QUESTIONS

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